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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/673,996   | 09/29/2003  | Tzachi Rafaeli       | COLB-124XX          | 2809             |
| 207  | 7590        | 07/13/2005           | EXAMINER            |                  |
| WEINGARTEN, SCHURGIN, GAGNEBIN & LEOVICI LLP<br>TEN POST OFFICE SQUARE<br>BOSTON, MA 02109 |             |                      | ARTMAN, THOMAS R    |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 2882                |                  |

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/673,996

Applicant(s)

RAFAELI ET AL.

Examiner

Thomas R. Artman

Art Unit

2882



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8, 10, 11, 13, 15 and 18-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-5, 10, 13, 15 and 18 is/are allowed.
- 6) ☒ Claim(s) 6-8, 11, 19 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-8, 11, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaiser in view of Longoni (ref. "AL" from PTO-1449 filed 02/09/2004).

Regarding claims 6 and 19, Kaiser discloses an apparatus and method for x-ray analysis of a sample (Figs.1 and 2), including:

- a) an x-ray excitation source 12 that generates an x-ray beam,
- b) an optical radiation source 21 which generates optical radiation 22 and is aligned with the x-ray excitation source,
- c) an x-ray optic 17 which is arranged to focus both the x-ray beam and the optical radiation onto a spot on the sample,
- d) one or more x-ray detectors 18 that receive x-ray photons from the spot on the sample and generate a first signal in response to the photons that is indicative of a characteristic of the sample (col.5, line 67, through col.6, line 2),

e) an optical detector 21 that receives the optical radiation reflected from the spot on the sample and generates a second signal that is indicative of an alignment of the spot with a target area of the sample (see at least col.6, lines 3-8).

Kaiser does not specifically disclose that the X-ray optic is a polycapillary optic.

Longoni specifically teaches the advantage of having a polycapillary x-ray optic such that finer positional resolution can be achieved through providing a smaller x-ray beam spot size on the sample (see bottom of col.2 of p.1001 through the top of col.1 of p.1002; also see col.1 of p.1005). Thus, smaller features can be accurately analyzed.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the device of Kaiser to have a polycapillary optic such that the position resolution is successfully made smaller for ease of measuring finer features on the sample.

With respect to claims 7 and 20, the x-ray beam causes the sample to emit fluorescent x-ray photons which are received by the x-ray detector, and where the first signal is indicative of a composition of a feature of the sample of the target area (col.5, line 62, through col.6, line 2).

With respect to claim 8, Kaiser does not specifically disclose that the one or more x-ray detectors are arranged so as to define a ring.

Longoni specifically teaches a ring detector for greatly improved x-ray fluorescence detection. The use of such a detector allows greater sensitivity due to higher count rates and finer resolution because the solid angle having the greatest probability of fluorescent x-ray emission from the sample is intercepted by the detector geometry (see at least col.1 of p.1002).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the device of Kaiser to have one or more detectors arranged so as to form a ring such that much improved sensitivity and resolution is achieved.

With respect to claim 11, Kaiser further discloses a controller (not shown) which aligns the x-ray optic with the sample responsively to the second signal so that the spot is incident on the target area (at least col.7, lines 1-65, as well as Figs.5-11).

*Allowable Subject Matter*

Claims 1-5, 10, 13, 15 and 18 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither teaches nor reasonably suggests an X-ray analysis device or method of use, where one or more detectors are arranged to define a ring around an irradiation spot on a sample, where the ring of detectors has a gap that is radially displaced from the X-ray beam axis, and further where an optical detector is placed in the gap in the ring such that it receives optical radiation from an optical source that is reflected off of the sample, thus generating a signal that is indicative of an alignment of the spot with a target area of the sample, as required by the combinations as claimed in each of claims 1 and 13.

Claims 2-5 and 15 are allowed by virtue of their dependency.

Claims 10 and 18 are allowed for reasons as stated in the previous Office action, dated December 28<sup>th</sup>, 2004, having been amended to included all the limitations of their respective base claims and intervening claims.

### *Response to Arguments*

Applicant's arguments filed April 27<sup>th</sup>, 2005, have been fully considered but they are not persuasive. Applicants assert that the teachings of Longoni regarding capillary optics are limited to monocapillary optics being placed within the X-ray tube, and therefore in now way teach the proposed substitution of a polycapillary optic for the collimator optic of Kaiser in order to meet the limitations of claim 6 as amended and new claim 19, specifically, using a polycapillary optic for focusing both the X-ray beam and the optical beam. The examiner respectfully disagrees.

Kaiser has an X-ray optic (collimator 17) that focuses both the X-ray beam and the optical beam onto a spot on the sample, as outlined above in the rejection of claims 6 and 19. Therefore, Kaiser specifically discloses the use of an X-ray optic to manipulate both X-ray and non-X-ray radiation. The only lacking feature is the use of a polycapillary optic instead of a pinhole collimator.

Longoni specifically teaches the use of capillary optics for having the distinct advantage over pinhole collimators of being able to analyze smaller features with higher efficiency because the capillary optics focus the X-ray beam to a much smaller size than is possible with "simple pinhole collimators." See pp.1001-1002 under Section II, "Spectrometer Architecture", second paragraph. Here, the teachings are clear and specific that capillary optics are better than pinhole collimators, and one skilled in the art having the benefit of the disclosure would therefore

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substitute a capillary optic for Kaiser's pinhole collimator for realizing the disclosed advantages. Furthermore, to address the limitation that the capillary optic is a polycapillary optic, Longoni specifically teaches that the use of a polycapillary optic will further improve the device through providing better positional resolution by more than a factor of 2 over other types of capillary optics (see pp.1005, left column). Therefore, the teachings of Longoni make it clear that the substitution of a polycapillary optic for a pinhole collimator for specific and significant advantages would have been obvious to the skilled artisan.

Applicants point out that Longoni implements the teaching by placing a monocapillary optic within the vacuum envelope of the X-ray tube (see Fig.4). In that particular location, the monocapillary optic would not be able to focus any radiation other than the X-ray radiation from the source, and therefore would not remedy the deficiency of Kaiser. However, Applicants are reminded that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). The precise way in which the reference practices its own teachings in no way limits the direct teachings and suggestions to the skilled artisan, particularly of substituting a polycapillary optic for a pinhole collimator. Kaiser's collimator manipulates both the X-ray beam and the optical beam, and Longoni provides the direct suggestion to substitute a polycapillary optic for a pinhole collimator for specific and critical advantages.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. She (US 5,351,279) teaches an optical source and mirror that are moved into and out of an X-ray beam path together for alignment purposes.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R. Artman whose telephone number is (571) 272-2485. The examiner can normally be reached on 9am - 6:30pm Monday - Friday.

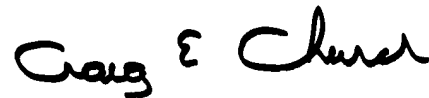
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished / applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas R. Artman  
Patent Examiner



Craig E. Church  
Primary Examiner